JMA-782

Creep Stress Analysis of Transversely Isotropic Rotating Disc Composed of Functionally Graded Material

Vikash Ghlawat[1*], Richa Sharma[2], Khursheed Alam[1]

[1] Department of Mathematics, School of Basic Sciences and Research, Sharda University, Greater Noida, India

[2] Department of Mathematics, Jaypee Institute of Information Technology, Noida, India

[*]Corresponding author's e-mail: vikashgahlawat25@gmail.com

ABSTRACT

Functionally graded piezoelectric materials (FGPMs) are materials that exhibit varying piezoelectric properties across their volume. This graded composition allows for tailoring the material's properties to meet specific requirements in various applications. The versatility of functionally graded piezoelectric materials makes them valuable across a range of technological applications, allowing for improved performance, efficiency, and adaptability in diverse fields. The purpose of the present problem is to analyse creep stresses in an annular disc composed of transversely isotropic piezoelectric functionally graded material with variable thickness parameter. The creep stresses are evaluated analytically using the approach of Seth's transition theory. The equations for electrical displacement and mechanical stresses are obtained through the stress-strain relationship. Substituting these relations into the equilibrium equation a non-linear differential equation is obtained. The numerical and graphical depiction of results shows the influence of the thickness parameter on circumferential stresses in the rotating disk's intermediate surface. Based on all the numerical discussions and calculations it is been concluded that disc composed of transversely isotropic piezoelectric material PZT-4 has higher creep stresses than other materials under consideration.

Keywords: Functionally graded, Piezoelectric, Rotating disc

How to Cite

V. Ghlawat, R. Sharma, K. Alam, "Creep Stress Analysis of Transversely Isotropic Rotating Disc Composed of Functionally Graded Material", *AIJR Abstracts*, pp. 57–57, Feb. 2024.

DOI: 10.21467/abstracts.165 ISBN: 978-81-965621-7-5 (eBook), 978-81-965621-4-4 (Paperback)